

FIG. 1

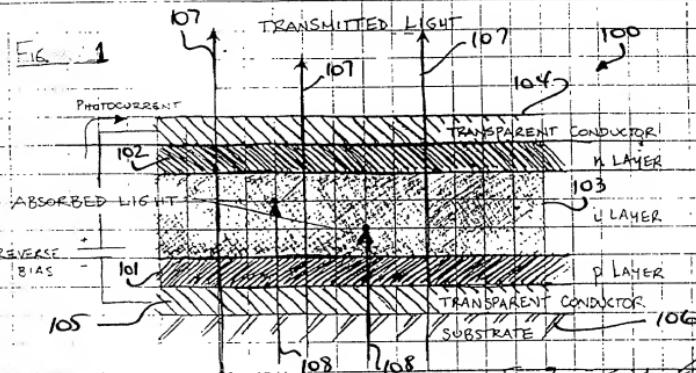


FIG. 4

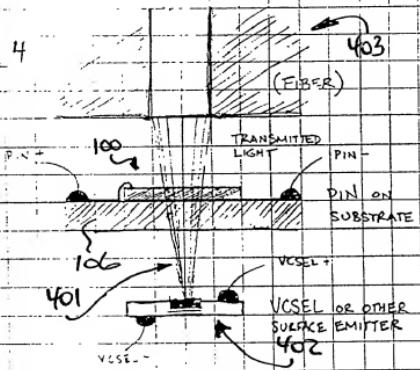


FIG. 7

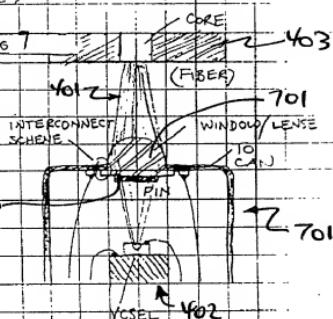


FIG. 5

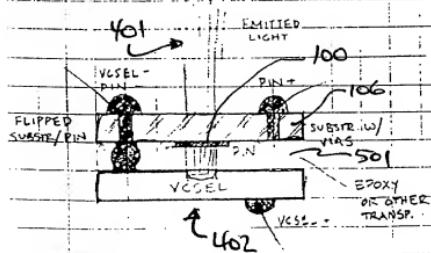
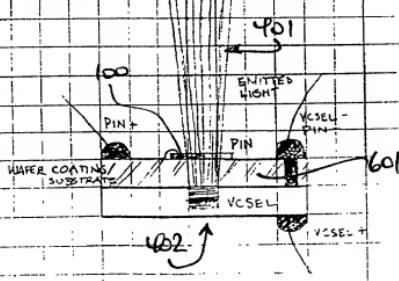


FIG. 6



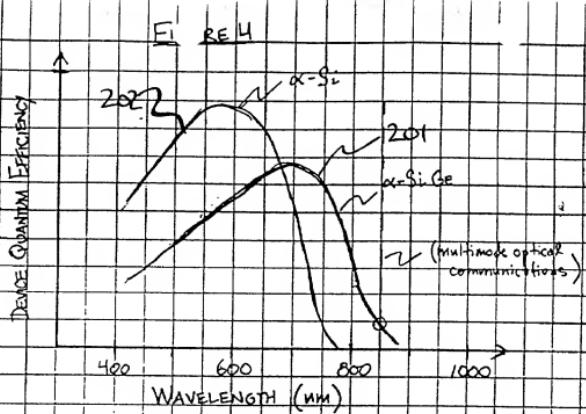
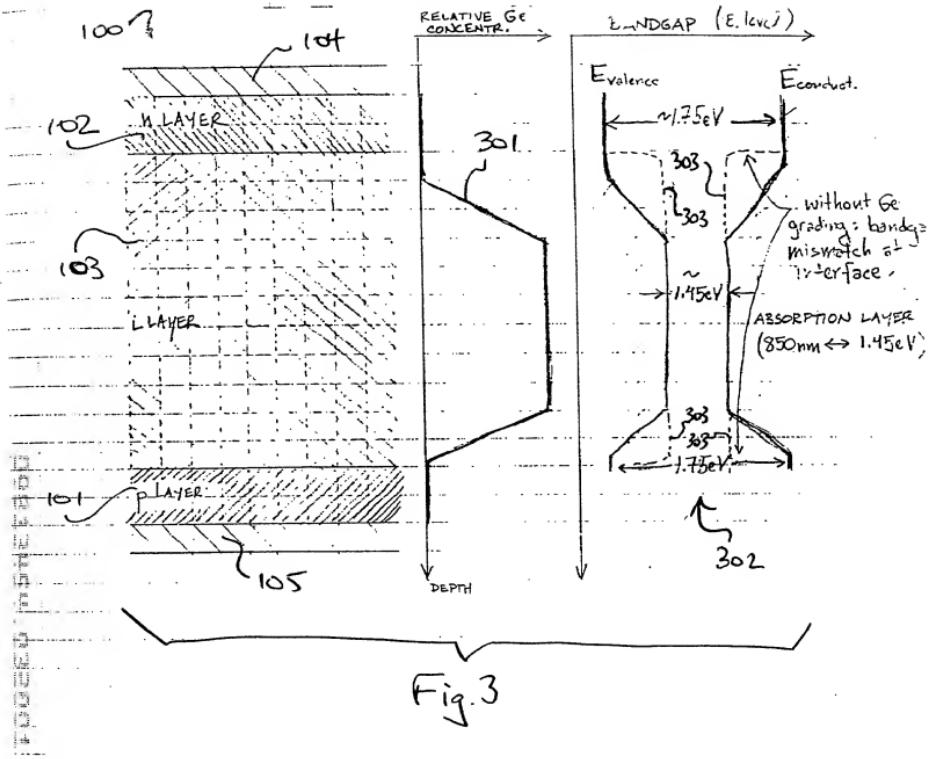


Fig. 2.



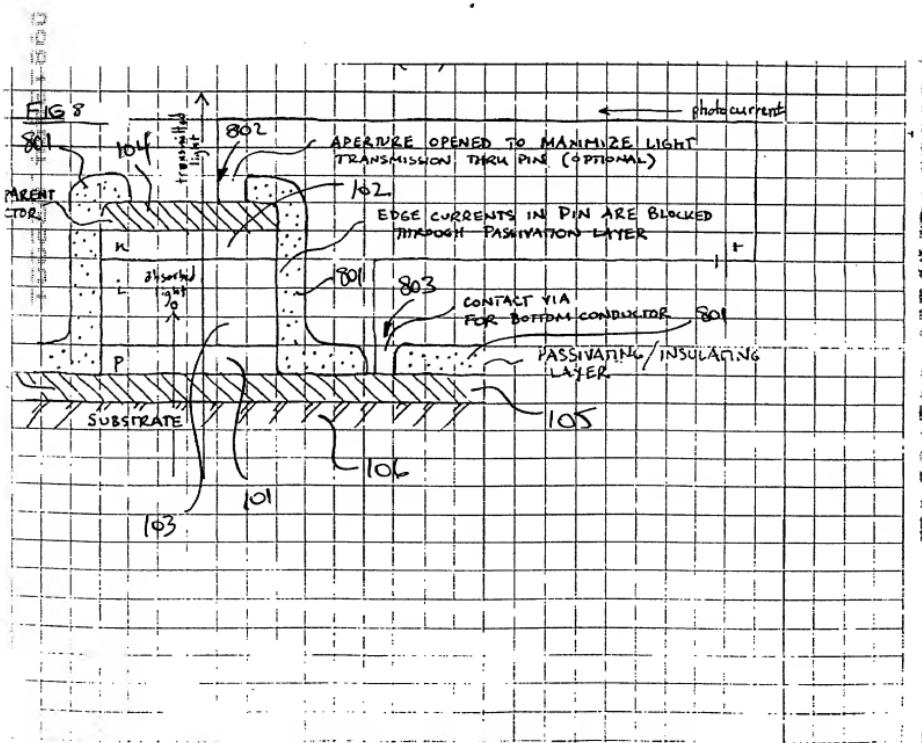
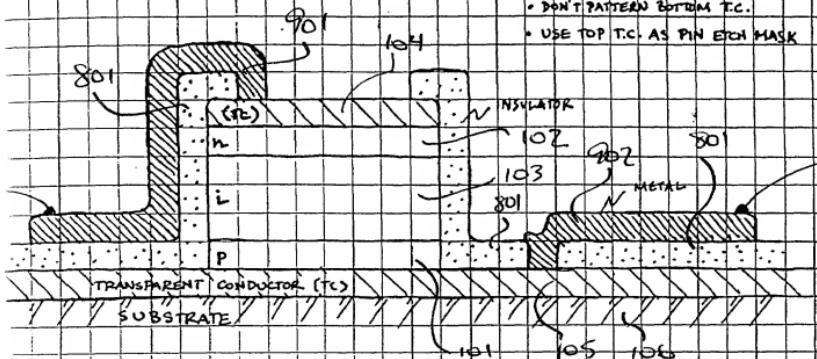


FIG 9



MOST SIMPLE STRUCTURE

- DON'T PATTERN BOTTOM T.C.
- USE TOP T.C. AS PIN ETCH MASK

FIG 10

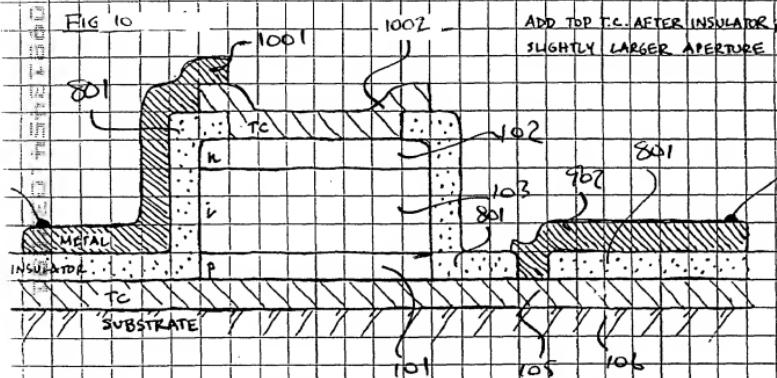
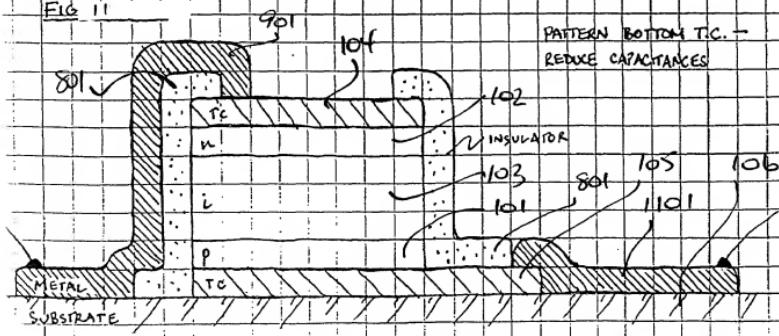


FIG 11



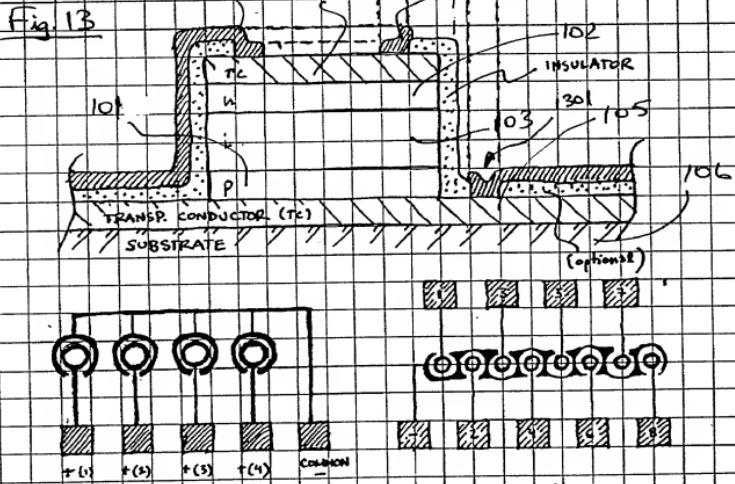
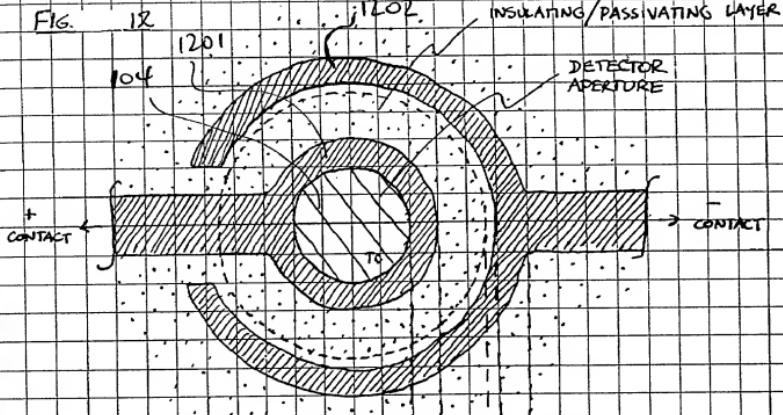


Fig. 14

Fig. 15

3/25/00

Fig. 16

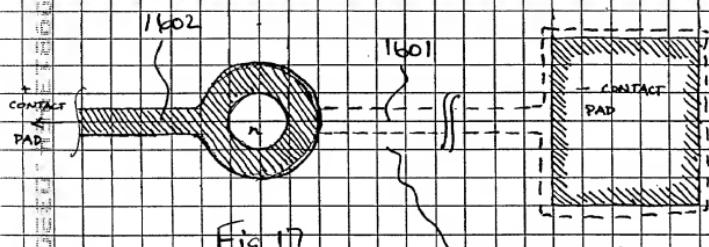
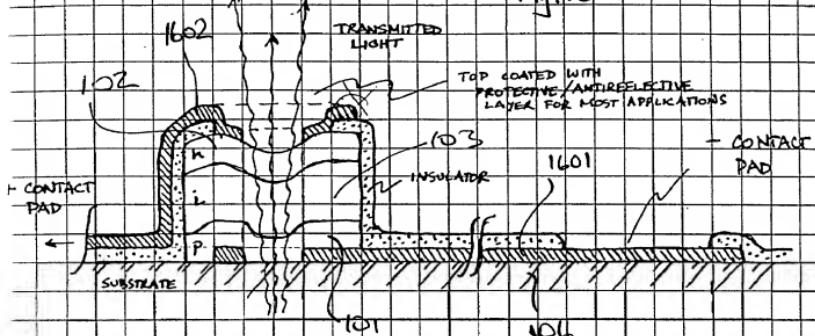
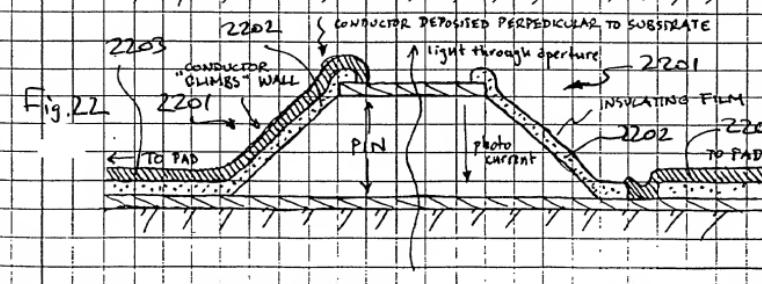
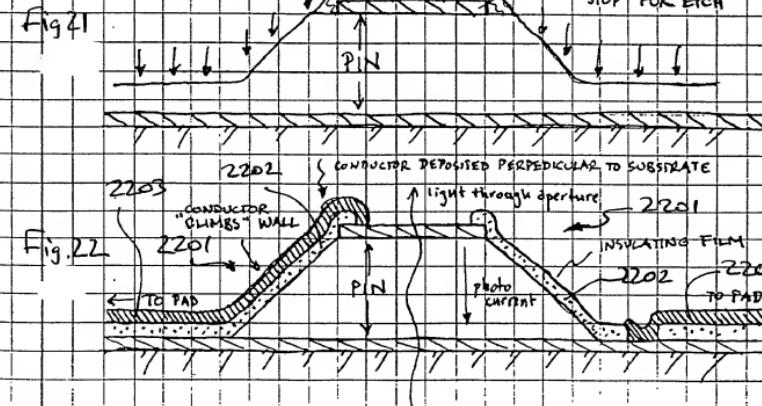
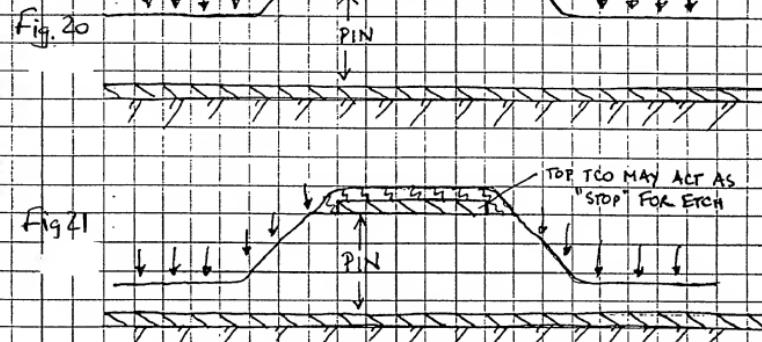
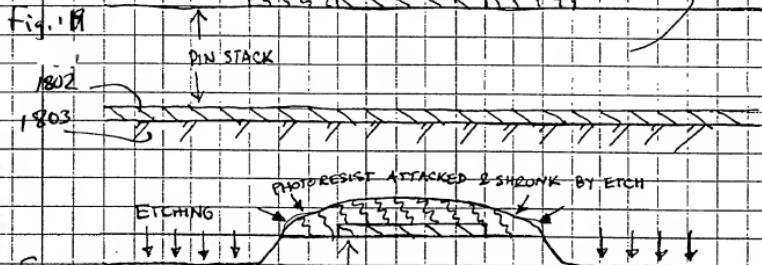
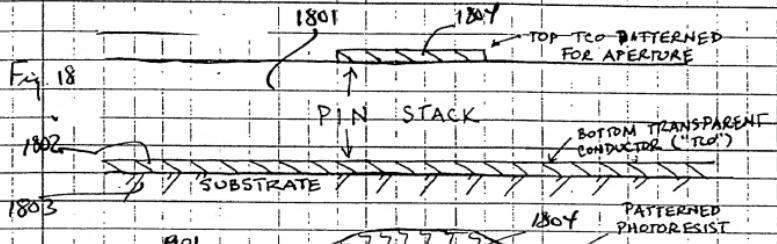


Fig. 17

BOTTOM METAL CONTACT MAY BE USED TO TIE TOGETHER ENTIRE ARRAY



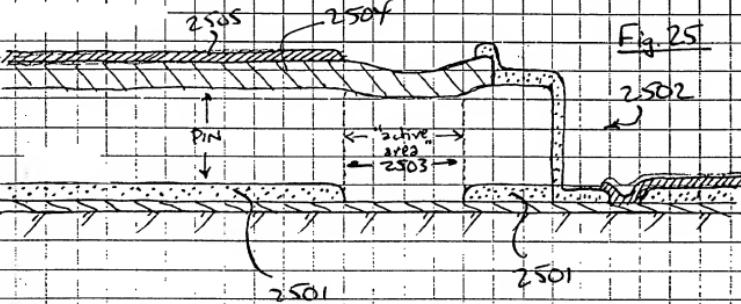
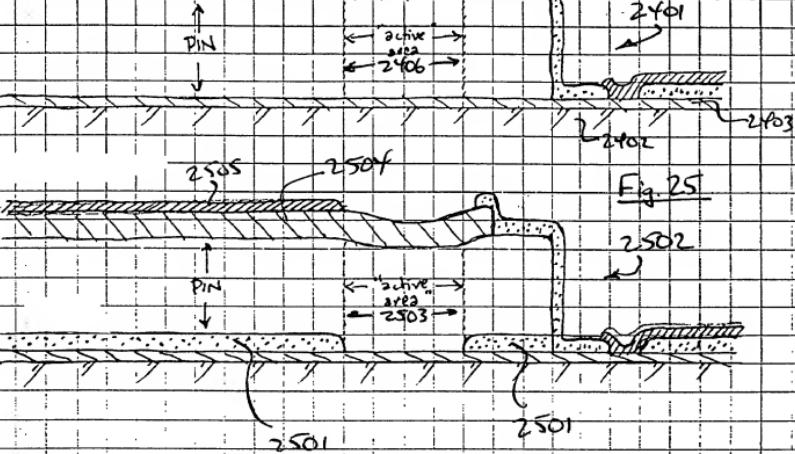
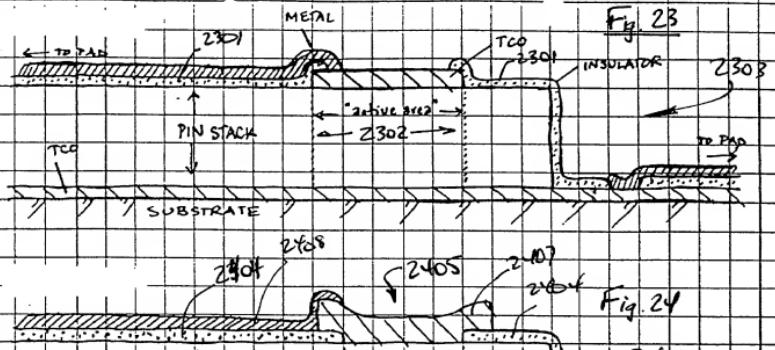


Fig 26

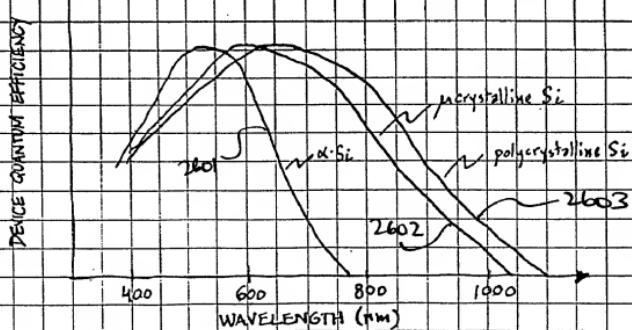


Fig. 27

2703 $\sim 10^4$
 2702 n/p mc-Si
 2701 i \times Si-Ge $\sim 10^5$
 n/p mc-Si

TRANSPARENT CONDUCTOR

SUBSTRATE

Fig. 28

$\sim 10^4$
 2803 n/p mc-Si
 2802 i \times Si-Ge $\sim 10^5$
 n/p poly-C-Si

Fig. 29

$\sim 10^4$
 2903 n/p mc-Si $\sim 10^5$
 2902 i \times mc-Si $\sim 10^5$
 n/p poly-C-Si $\sim 10^5$

3001b

3005

3003

3001

n/p

106

3006

106

3001

n/p

106

3002

n/p

106

3001

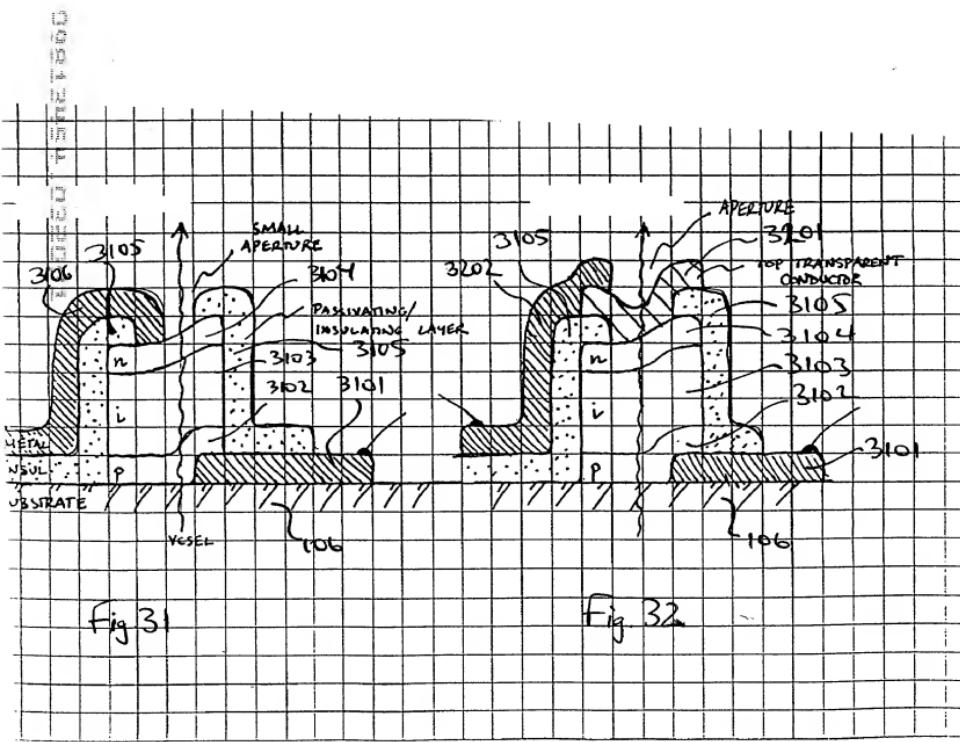


Fig. 31

Fig. 32

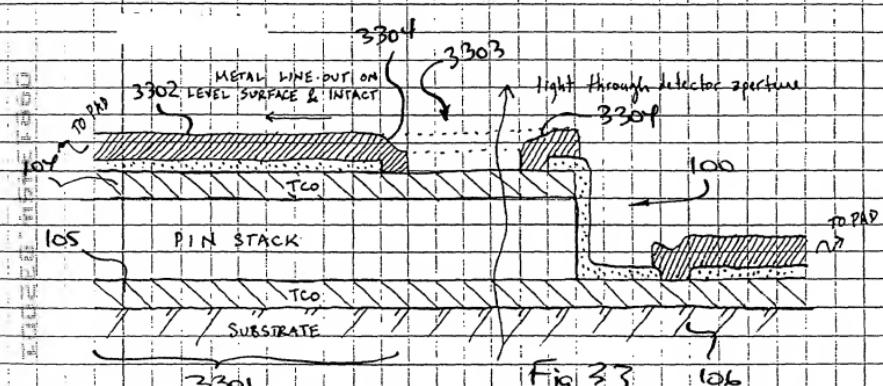
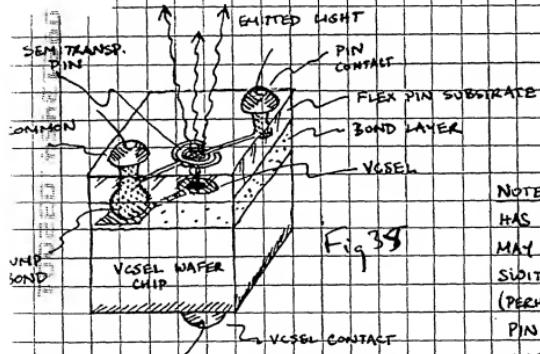
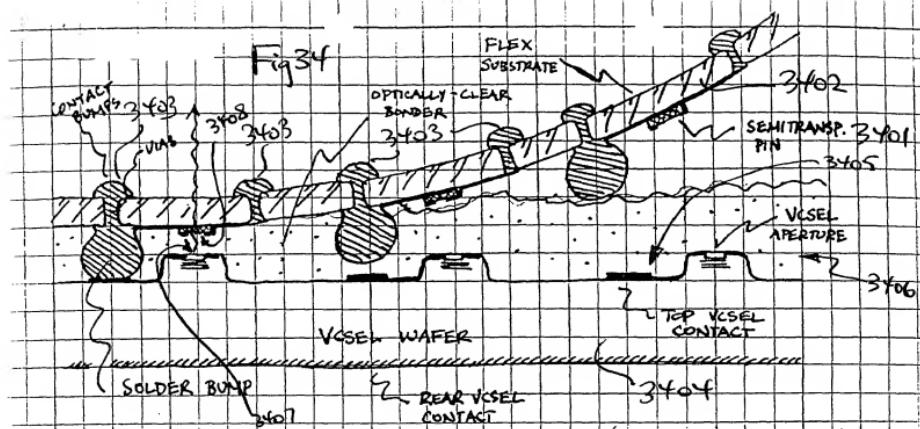
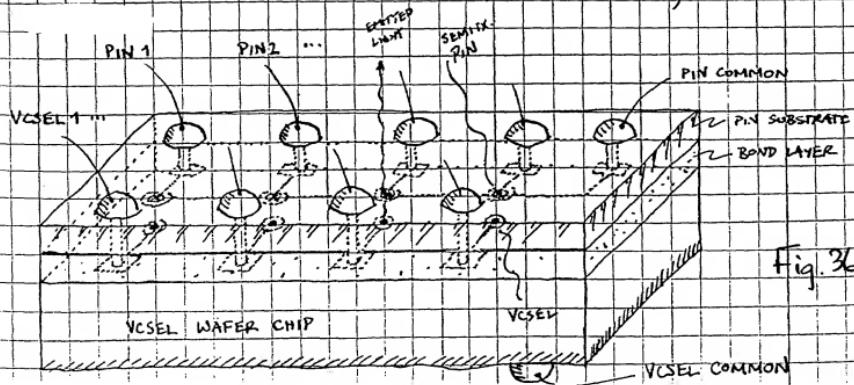


Fig 33 106



NOTE: ALTERNATIVE CONFIGURATION
HAS 3 TOP CONTACTS (NO COMMON);
MAY BE PREFERABLE FOR HIGH-SPD.
SWITCHING.
(PERHAPS EVEN FORM HOLE THROUGH
PIN SUBSTRATE & BOND LAYER TO
VSEL TOP CONTACT).



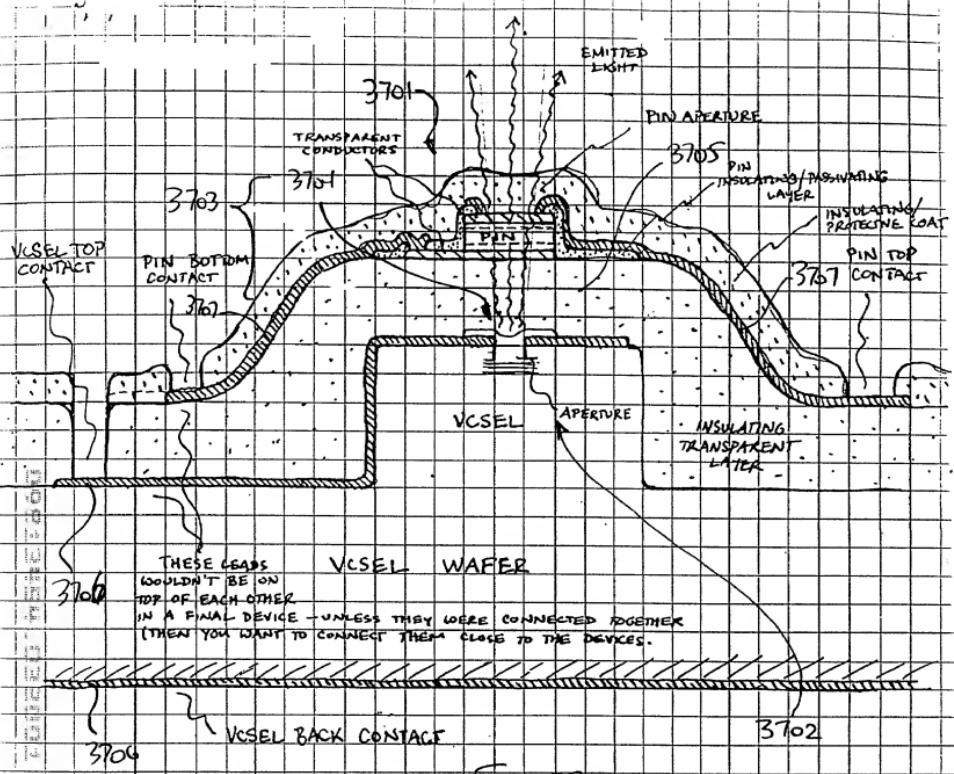


Fig. 37

3/28/00

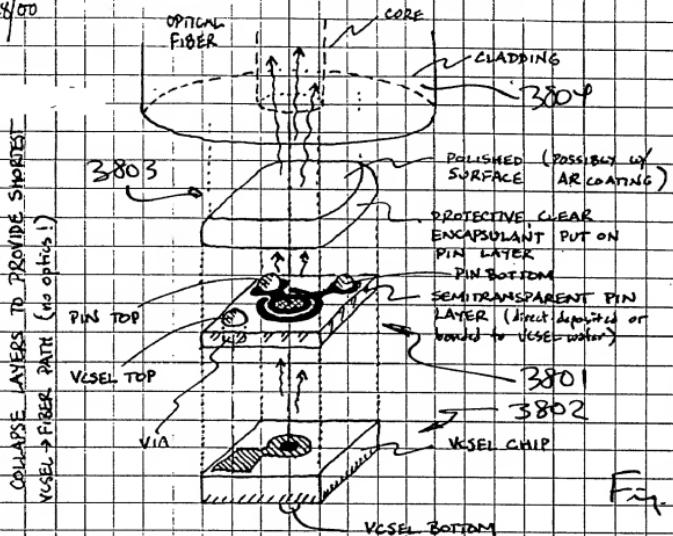


Fig. 38

".. SUCH A PACKAGE WOULD ALLOW LOW-COST, DIRECT COUPLING IN A FIBER CONNECTOR (VCSEL APERTURE $< 25\text{ }\mu\text{m}$ AND MULTIMODE FIBER CORE $\approx 50\text{--}62.5\text{ }\mu\text{m}^2$; VCSEL BEAM DIVERGENCE $\leq 20^\circ$, AND PIN LAYER IS THIN).

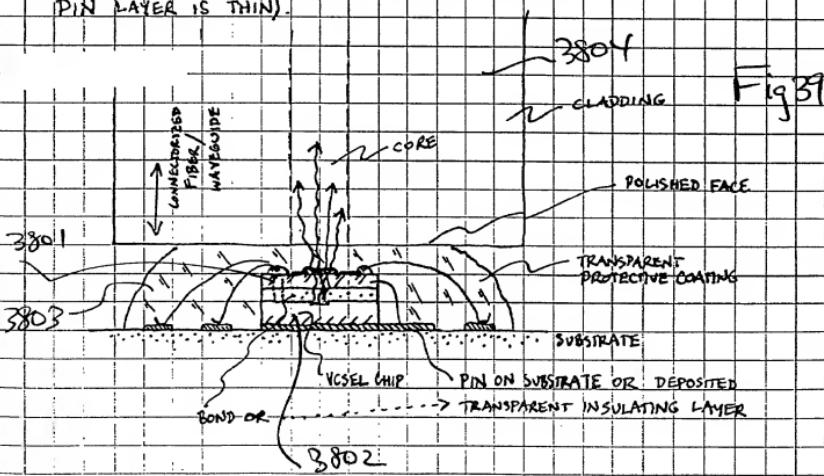
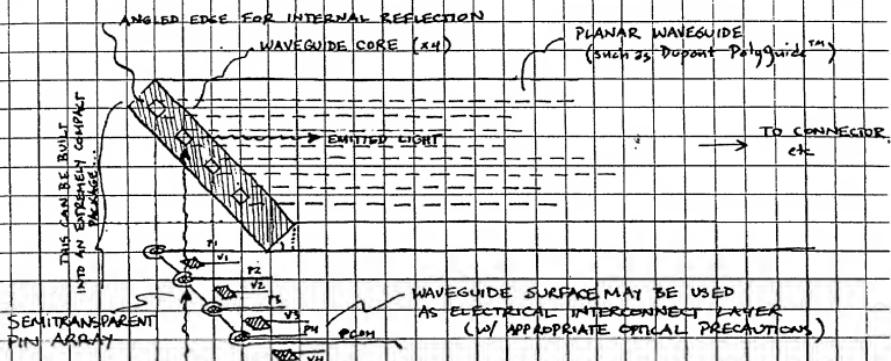


Fig. 39

Fig. 40



PIN ARRAY IS :

- (1) PATTERNED ON WAVEGD.
- (2) PATTERNED ON VCSEL CHIP
OR
- (3) PATTERNED ON SEPERATE
SUBSTRATE

Fig. 41

SEMITRANSP. PIN
ARRAYVCSEL ARRAY
(CHIPPED)PLANAR WAVEGUIDE
WITH FAN OUT

USE VERY SMALL INTEGRAL
VCSEL ARRAY TO ADDRESS
MULTIPLE FIBERS / STANDARD
CONNECTORS.

"STANDARD" MULTIFIBER
CONNECTOR

Fig. 42

SEMITRANSPARENT PIN ARRAY

MULTIPLE
VCSEL ARRAYWAVELENGTH
MULTIPLEXERTO SINGLE-FIBER
CONNECTOR

PLANAR WAVEGUIDE

DRAFTED BY: [REDACTED]